(19) World Intellectual Property **Organization**

International Bureau



(43) International Publication Date 23 September 2004 (23.09.2004)

PCT

(10) International Publication Number WO 2004/080928 A3

(51) International Patent Classification7: C10G 21/16

C07C 7/10,

(21) International Application Number:

PCT/IB2004/000656

(22) International Filing Date: 10 March 2004 (10.03.2004)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

10 March 2003 (10.03.2003) US 60/453,418 10 March 2003 (10.03.2003) **7.A** 2003/1937 60/496,816 21 August 2003 (21.08.2003) US 21 August 2003 (21.08.2003) ZA 2003/6524

- (71) Applicant (for all designated States except US): SASOL TECHNOLOGY (PROPRIETAY) LIMITED [ZA/ZA]; 1 Sturdee Avenue, Rosebank 2196 (ZA).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): DE WET, Johan, Pieter [ZA/ZA]; 65 Beethoven Street, Vanderbijlpark 1911 (ZA). JANSEN, Wilhelmina [ZA/ZA]; 14 Deo Volente Mozart Street, Vanderbijlpark 1911 (ZA). JACOBSON, Paul [ZA/ZA]; 14 Sasurei Court, Toon van der Heever Street, Sasolburg 9570 (ZA).
- (74) Agents: DONALD, Heather, June et al.; Spoor & Fisher, PO Box 41312, Craighall 2024 (ZA).

- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
- (88) Date of publication of the international search report: 11 November 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: EXTRACTION OF OXYGENATES FROM A HYDROCARBON STREAM

(57) Abstract: This invention relates to a commercially viable process for extracting oxygenates from a hydrocarbon stream, typically a fraction of the condensation product of a Fischer-Tropsch reaction, while preserving the olefin content of the condensation product. The oxygenate extraction process is a liquid-liquid extraction process that takes place in an extraction column using a mixture of methanol and water as the solvent, wherein an extract from the liquid-liquid extraction is sent to a solvent recovery column from which a tops product comprising methanol, olefins and paraffins is recycled to the extraction column, thereby enhancing the overall recovery of olefins and paraffins.



A. CLASSIFICATION OF SUBJECT MATTER IPC 7 C07C7/10. C10G21/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

 $\begin{array}{lll} \mbox{Minimum documentation searched (classification system followed by classification symbols)} \\ \mbox{IPC 7} & \mbox{C07C} & \mbox{C10G} \\ \end{array}$

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, CHEM ABS Data

0. 0000	ENTS CONSIDERED TO BE RELEVANT	
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02/31085 A (SASOL TECHNOLOGY PTY LTD; SCHOLTZ JACOB JOHANNES (ZA); WET JOHAN PETE) 18 April 2002 (2002-04-18) page 3, paragraph 3 - page 4, paragraph 4 claims 1-16	1-16
X	US 4 603 225 A (COLAIANNE JAMES ET AL) 29 July 1986 (1986-07-29) column 2, line 66 - column 3, line 8 claims 1-12	1-16
X	DE 199 11 910 A (LINDE AG) 21 September 2000 (2000-09-21) column 1, line 1 - line 23 column 1, line 48 - line 59 column 3, line 8 - line 29 claim 1	1-16

Further documents are listed in the continuation of box C.	Patent family members are listed in annex.
Special categories of cited documents: A* document defining the general state of the art which is not considered to be of particular relevance E* earlier document but published on or after the international filing date C* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) O* document referring to an oral disclosure, use, exhibition or other means P* document published prior to the international filing date but later than the priority date claimed	 *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family
Date of the actual completion of the international search 30 August 2004	Date of mailing of the international search report 14/09/2004
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	O'Sullivan, P

INTERNATIONAL SEARCH REPORT

'IB2004/000656

tegory °	citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	
	US 4 686 317 A (QUANN RICHARD J ET AL) 11 August 1987 (1987-08-11) column 1, line 10 - line 17 table 2	1,4-7, 10,11	
	US 4 513 156 A (TABAK SAMUEL A) 23 April 1985 (1985-04-23) column 2, line 6 - line 12 column 2, line 22 - line 30 column 2, line 49 - line 50	1-16	
	. · .		
	·		
		·	

INTERNATIONAL SEARCH REPORT

/IB2004/000656

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
WO 0231085	A	18-04-2002	AU	9408101	A	22-04-2002
			CN	1468292	T	14-01-2004
			EP	1328608		23-07-2003
			WO	0231085		18-04-2002
			JP	2004511620		15-04-2004
			US	2004044263	A1	04-03-2004
US 4603225	A	29-07-1986	NONE			
DE 19911910	A	21-09-2000	DE	19911910	A1	21-09-2000
			ZA	200001295	Α	11-10-2000
US 4686317	Α .	11-08-1987	ZA	8608851	A	27-07-1988
US 4513156		23-04-1985	US	4626415	A	02-12-1986
			ZA	8502841	Α	26-11-1986